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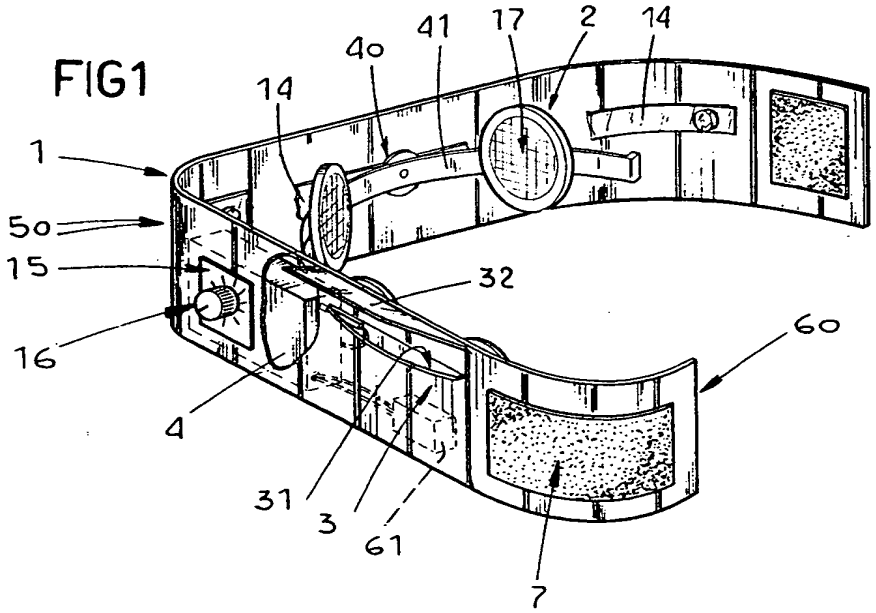
(54) Belt with a support for adjusting the position of electrodes.

(57) The invention relates to a support for bearing and positionally adjusting electrodes (2) of portable belt (1) devices (50) for passive gymnastics, in which the electrodes (2) are placed in contact with the skin in such a way as to transmit electric impulses produced by a current generator (4) to the said skin. The support (40) comprises a projecting support element (41), supporting a pair of electrodes (2) rotatably interconnected to the belt (1) device (50) in such a way as to rotate with respect to the said device (50), permitting the positioning of the electrodes (2) longitudinally or transversally to the device (50), correspondingly to the development of the muscle to be subjected to stimulation.

FIG1



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The invention relates to a support for bearing and positionally adjusting electrodes of portable belt devices for passive gymnastics, in which the electrodes are placed in contact with the skin in such a way as to transmit electric impulses produced by a current generator to it.

The said impulses, as is known, cause the involuntary and rhythmic contractions of the muscle subject to the impulses, with benefits for the treated part in the form of muscle toning and shaping.

Prior art portable devices substantially envisage a belt, which the user can wear, slidably bearing a series of electrodes on a longitudinal guide interconnected to the said belt. The said electrodes are destined to come into contact with the skin.

The movement of the electrodes along the guide is permitted by the fact that they are connected to the current generator by means of conductors of adequate length. The conductors are contained within a special pocket internally of the belt, which houses the conductors together with the necessary supply battery.

The fundamental drawback of such prior art devices is that the electrodes are positionable along the sliding guide only longitudinally to the belt. The said devices, therefore, can be used correctly for treatment of the abdomen and the gluteus, but do not permit rational treatment of muscles which are arranged transversally to the wrap-round lines of the belt, such as, for example, in the case of limb muscles.

It is indeed clear that in the case of limb muscles, a correct stimulation could be had only by arranging the belt longitudinally, compatibly with the development of the muscle bundles, but in such a case it would be necessary to forego the full closure of the belt, with the disadvantages in terms of comfort and efficiency that such a contingency would necessarily incur.

An aim of the present invention, as it is characterised in the claims, is that of obviating the abovementioned drawbacks. The invention attains the said aim by means of a support, applicable to a belt device for passive gymnastics in which the electrodes are placed in contact with the skin in a such way as to transmit electric impulses to the skin, which impulses are produced by a current generator, comprising a support element of the electrodes which projects from the belt, the said support element being rotatably interconnected with the device in such a way as to rotate with respect to the belt, enabling a couple of electrodes to be positioned longitudinally or transversally to the device itself, correspondingly to the development of the muscle bundle to be subjected to stimulation.

The support element of the electrodes has a curved profile, with its concavity turned towards the skin, so that when an electrode is placed in contact with the part to be treated, and the belt device is closed, the support element elastically contrasts the electrodes, pressing them on to the skin and opposing their accidental detachment therefrom.

The fundamental advantages of the invention essentially consists in the possibility of correctly and comfortably involving a wider range of parts of the body in passive gymnastics, independently of muscle direction with respect to the attachment line of the belt device.

A further advantage of the invention is represented by its easy dismounting and remounting, enabling easy cleaning and maintenance.

A still further advantage of the invention lies in the fact that its tension generator and relative battery can be contained in a cavity made in an element which is a component of the support. This contributes considerably to reducing the costs and complexity of the entire belt device to which the support is applied, also permitting the realisation of belt devices for passive gymnastics which are more compact, and thus suitable for the treatment of smaller areas of the human anatomy or parts of the body such as wrists, ankles etc.

Further characteristics and advantages of the present invention will better emerge from the detailed description that follows, together with the accompanying drawings which represent a preferred but not exclusive embodiment and in which:

- figure 1 shows, in a perspective view of the entirety of the invention, a belt device for passive gymnastics to which a support according to the invention is fitted;
- figure 2 shows the invention represented according to a frontal view of its entirety;
- figure 3 shows the invention of figure 2 in an exploded plan view;
- figure 4 shows, in an exploded perspective view, an electrode applied to a support made according to the invention;
- figure 5 shows a particular of the invention represented in enlarged scale, in one of its alternative embodiments.

With reference to the accompanying drawings, figure 1 shows a belt 1 device 50 to be worn for passive toning and shaping gymnastics, equipped with a generator 4 of current which is electrically interconnected with electrodes 2 destined to operate in direct contact with the skin in such a way as to transmit to it electrical impulses of appropriate characteristics.

The belt 1 is made of highly-deformable plastic material and exhibits at its opposite ends 60 velcro elements 7 reciprocally superimposable and forming together an length-adjustable closing device according to the requirements of the user.

The current generator 4 is contained, together with an autonomous battery 61, internally to a pocket 3 made internally to the belt 1 and is accessible through an opening 31 hidden by a fold 32.

The belt 1 further comprises a panel 15 equipped with a command knob 16 for the activation and positional adjustment of the electrodes 2 on the skin.

The support 40 comprises a projecting support element 41, projecting towards the user's skin and supporting a pair of electrodes 2 slidably interconnected with the support element 41 so as to be slidable with respect to the said support element 41, as is indicated in figure 3.

Indeed, with reference also to figure 4, it can be observed that the electrodes 2, of known type, comprise their own supports 12 equipped with grooves 13 destined to associate slidably with the projecting support element 41. The supports 12 are made in two semiparts 62, 63 reciprocally frontally and movably associable, by means of pills 53 borne on a first semipart 62, frontally insertably in corresponding cavities 52 made in the second semipart 63.

The electrode 2 is covered with a tract of sponge 17 turned towards the skin, and is also interpositioned between the semiparts 62, 63, of the supports 12, destined to be coated with an electricity-conducting conductor.

The support element 41 of the electrodes 2 is made of deformable plastic material, but has a greater rigidity than the belt 1 material. It is further equipped, at its ends 46 (see figure 3) with transversal strikers 47 to limit the sliding of the electrodes 2 with respect to the projecting support element 41 itself.

The said projecting support element 41 is further rotatably interconnected, at its halfway point 45, (see figures 1 and 3), to the belt 1 device 50 in such a way as to rotate about the said device 50 and permit the electrode pair 2, arranged bilaterally to the said halfway point 45 to be longitudinally or transversally positioned with respect to the device 50 and corresponding to the development of the muscle bundle to be subjected to electrical stimulation.

With reference to figures 3 and 5, it can be observed that the support 40 preferably comprises also a longitudinal sliding element 43, longitudinally sliding with respect to the belt 1, pierced by a hole 48 shaped complementarily to the guide 14 itself.

In the above case the projecting support element 41 of the electrodes 2 is rotatably interconnected to the longitudinal sliding element 43, so that the combination of the longitudinal sliding element 43 sliding possibilities along the guide 14, and the rotatable connection between the said longitudinal sliding element 43 and the projecting support element 41 of the electrodes 2 confers on the said electrodes 2 a rotating-sliding ability with respect to the device 50.

The connection of the projecting support element 41 to the longitudinal sliding element 43 is preferably realised (see figures 3 and 5) by means of a pivot 42, projectingly supported by the projecting support element 41 of the electrodes 2, and elastically snap-on fitted in a corresponding hinge 51 complementarily shaped, made in the longitudinal sliding element 43.

With reference to figure 3, it can be observed that the projecting support element 41 of the electrodes 2 preferably exhibits a curved profile having, when the belt 1 device 50 is worn, its concavity turned towards the skin. This advantageously allows a contrasting elastic pressure of the electrodes 2 against the skin and ensures the said electrodes 2 positional stability well as the continuity of the electrical current.

In an alternative embodiment of the invention, represented in figure 5, the support 40 can be conformed in such a way as advantageously to incorporate also the generator 4 of current for the electrodes 2 and the relative battery 61, in a special cavity 52 made in the longitudinal sliding element 43.

From this the possibility derives of considerably simplifying the structure of the belt 1 device 50.

Figures 3 and 5 show that by equipping the guide 14 with an adjustable closing device, for example of the type similar to that constituted by the vellcro elements 7 applied to the ends 60 of the belt 1, it is possible to realise a low-cost belt device 50, advantageously applicable to the treatment of small parts of the human anatomy, such as wrists, ankles etc.

Claims

1. A support for bearing and positionally adjusting electrodes (2) of portable belt (1) devices (50) for passive gymnastics, in which electrodes (2) are placed in contact with the human skin in such a way as to transmit electric impulses produced by a current generator (4) to the skin, said support (40) being characterised in that it comprises at least one projecting support element (41) of at least one said electrode (2), which projecting support element (41) is rotatably interconnected to the said belt (1) device (50) in such a way as to rotate, with respect to the said device (50), enabling a pair of the said electrodes (2) to be positioned longitudinally or transversally to the said device (50) correspondingly to the development

of a muscle to be subjected to electrical stimulation.

2. A support as in claim 1, wherein the said belt (1) device (50) comprises a guide (14) for the longitudinal positioning of the electrodes (2), characterised in that it comprises a longitudinal sliding element (43) of the support (40), slidably associated with the said guide (14), the said support element (41) being rotatably interconnected to the said longitudinal sliding element (43) in such a way as to determine, for the said electrodes (2), the possibility to rotate-slide with respect to the said device (50).

3. A support as in claim 1, characterised in that the said projecting support element (41) is interconnected to the said belt (1) device (50) at a halfway point (45) on the element (41), and bears a pair of electrodes (2) arranged bilaterally to the said halfway point (45).

4. A support as in claims 1, 2 or 3, characterised in that the said projecting support element (41) exhibits a curved profile having a concavity turned towards the user's skin, which concavity is destined to exert an elastically contrasted pressure of the said electrodes (2) against the said skin during use of the said belt (1) device (50).

5. A support as in claims 1, 2 or 3 characterised in that the said electrodes (2) are slidably interconnected to the said projecting support element (41) in such a way as to be slidable with respect to the said projecting support element (41).

6. A support as in claim 2, characterised in that the said projecting support element (41) is equipped with a pivot (42) elastically snap-on fittable in a corresponding hinge (51) made on the said longitudinal sliding element (43), associated to the said guide (14).

7. A support as in claim 2, characterised in that the said longitudinal sliding element (43) is pierced by a hole (48) shaped complementarily to the said guide (14).

8. A support as in claim 2, wherein the electrodes (2) are fed by an autonomous generator (4) of current internally incorporated in the said belt (1) device (50), the said support (40) being characterised in that the said longitudinal sliding element (43) is conformed in such a way as to exhibit a cavity (52) internally to which the said generator (4) of current is housed.

9. A support as in claim 5, characterised in that the said projecting support element (41) exhibits, at at least one end (46), a transversal striker (47) to limit the sliding of the said electrode (2) with respect to the said projecting support element (41).

FIG1

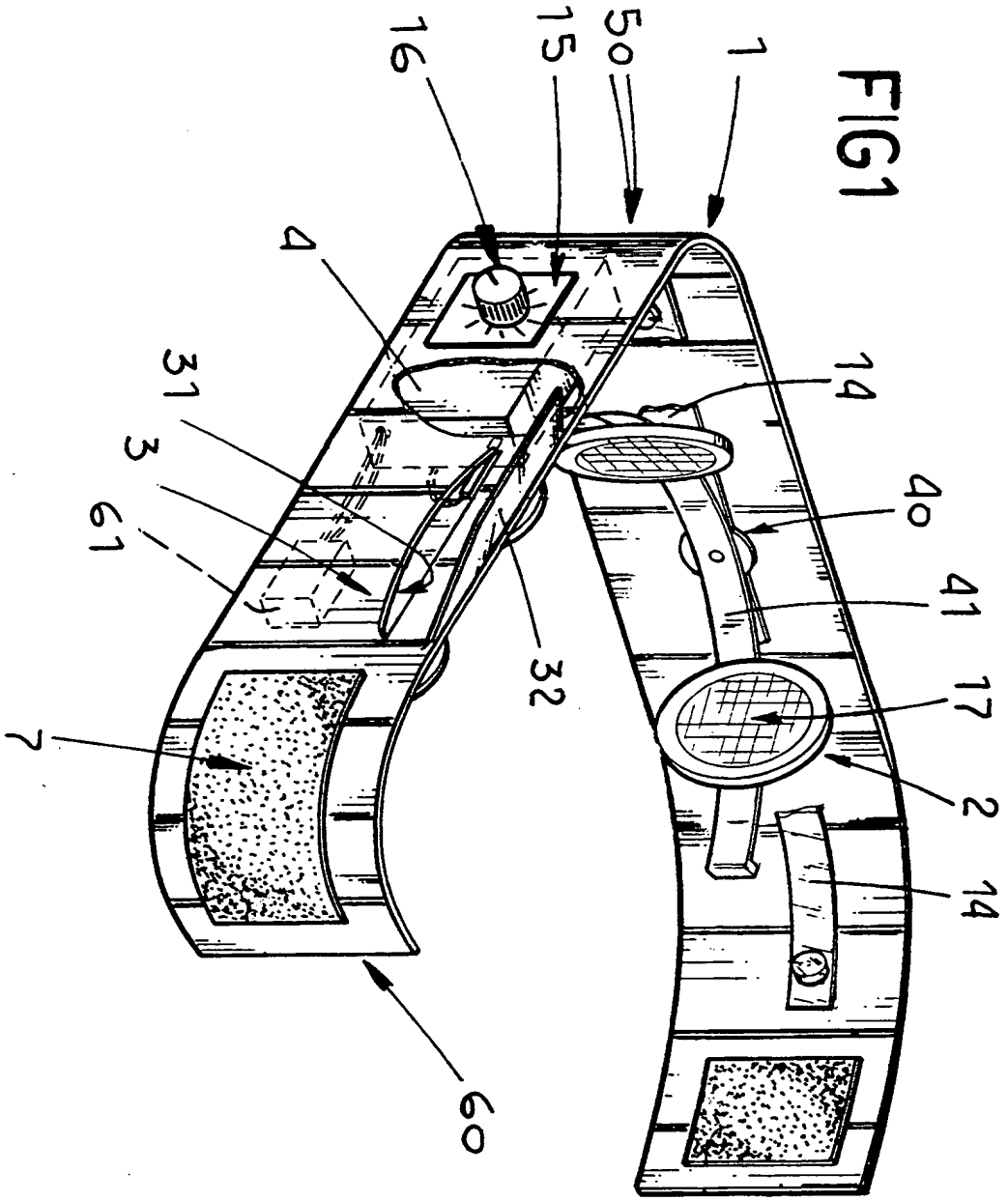


FIG 2

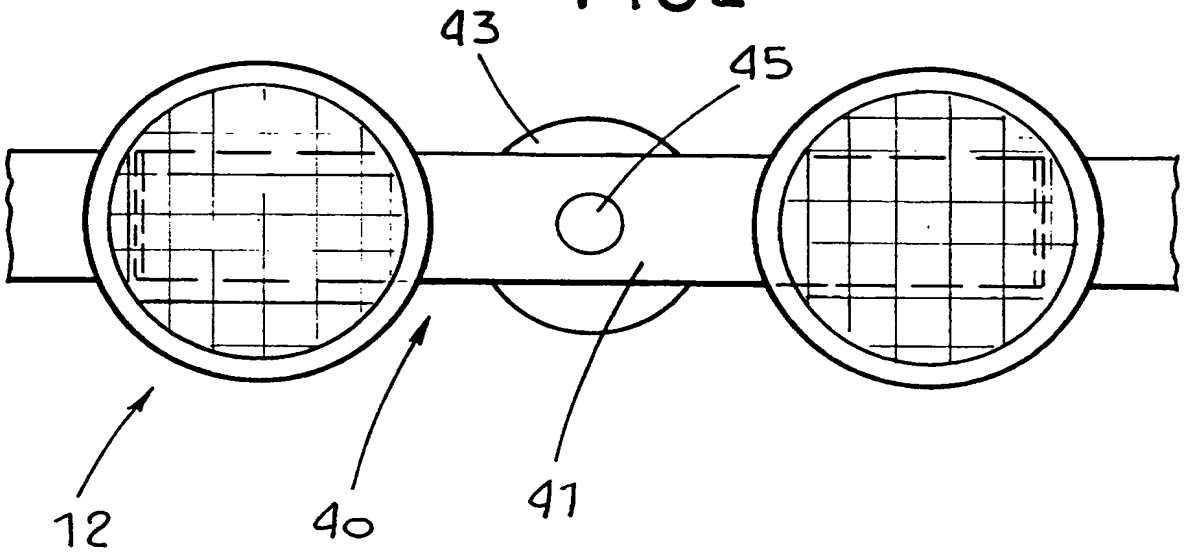


FIG 3

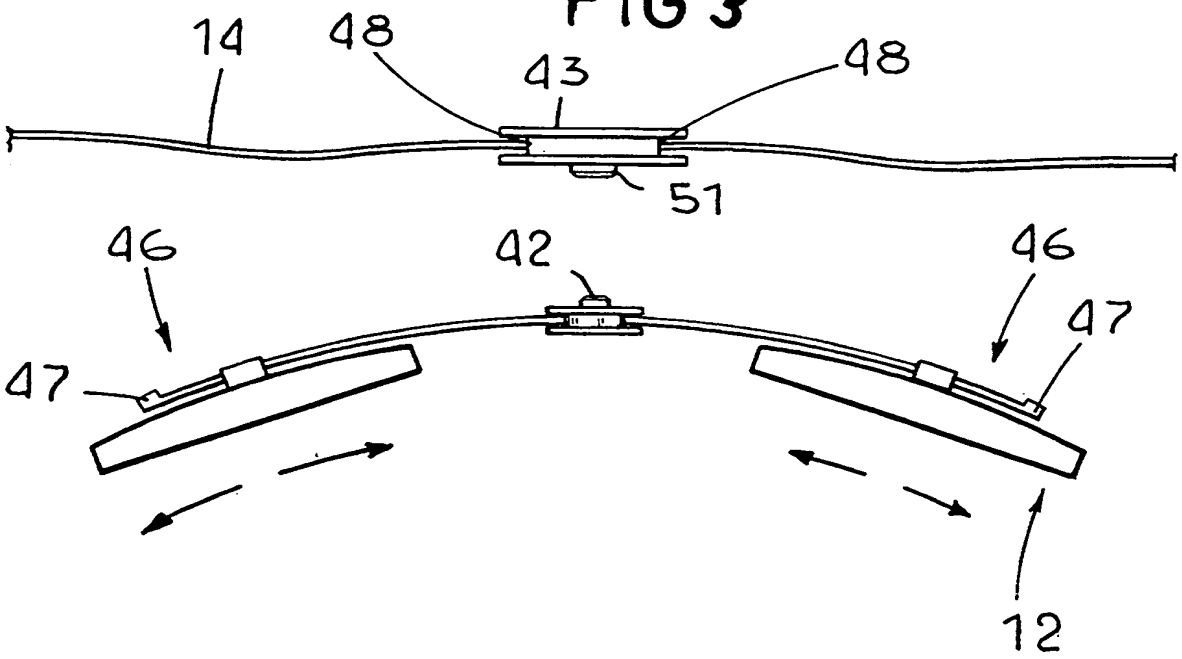


FIG 4

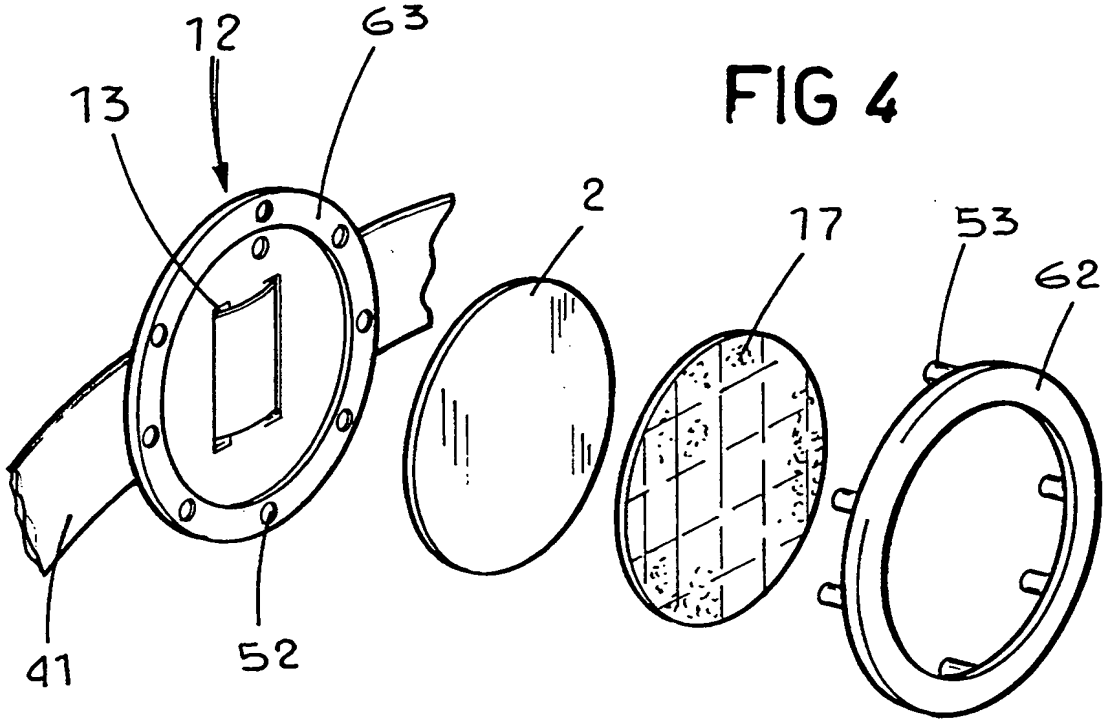
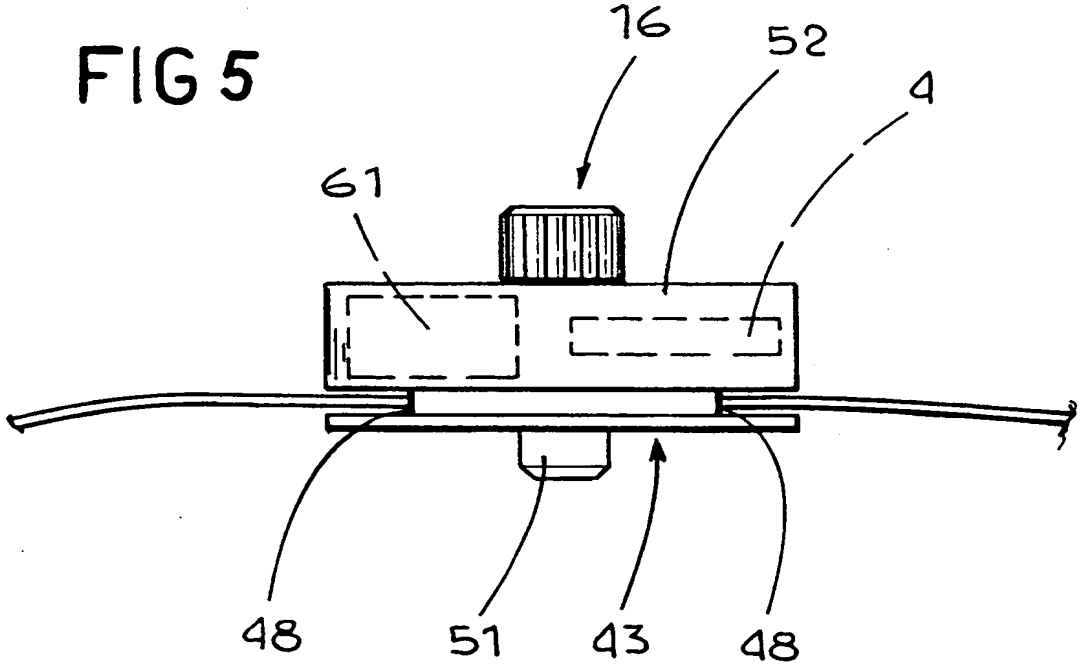


FIG 5



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EUROPEAN SEARCH REPORT

Application Number
EP 92 83 0683

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 483 072 (VUPIESSE) * the whole document * ---	1,2,5,8	A61N1/22 A61N1/32
A	US-A-3 881 495 (PANNOZZO ET AL) * column 5, line 5 - line 28; figures 4,5 * ---	1,3,4,6	
A	DE-A-228 048 (AUB) * figure 1 * -----	1,9	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A61N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 AUGUST 1993	LEMERCIER D.L.L.

CATEGORY OF CITED DOCUMENTS

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